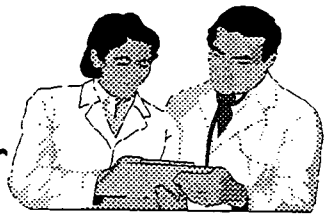
# LabLink



## Laboratory Information from the Michigan Department of Community Health

Vol. I, No. 4 April 1996


## Laboratory Disease Reporting Responsibilities

*Frances Pouch Downes, Dr.P.H.*

All medical laboratories in Michigan play an important role in controlling communicable diseases. By meeting the legal obligation (Michigan PA 368) to report positive laboratory results for 38 infectious diseases (Table ) and the unusual occurrence, outbreak, or epidemic of any infection, laboratories enable public health epidemiologists to monitor disease activity. The data generated by laboratory-based surveillance is critical for public health to assess community health status, to identify infectious disease problems, allocate resources appropriately, to trigger outbreak investigations and to develop control strategies. Without the input from the clinical laboratories in our Michigan communities, infectious disease control activities would be paralyzed. Statistics on some of these diseases are also forwarded to the Centers for Disease Control and Prevention where they are also combined with other state's data, analyzed and used to initiate appropriate federal disease control activities and funding.

The report consists of the laboratory result; the patient's full name, address, telephone number, date of birth; the laboratory's name and address; and the name, address and telephone number of the health care provider who ordered the test(s). Reports should be filed either by completing specified disease forms available from local public health departments or MDCH/CPHA/Disease Control Division or a laboratory generated form containing the above information. Reports are to be sent to the local health department in the patient's county of residence. Immediate reporting is required for 19 infectious diseases, while the others must be reported within three days of discovery. In addition to the above list of specific infectious agents, the laboratory director is authorized to report any other disease, condition or infection he/she judges to be a potential public health threat. All reports are kept confidential. If you have questions concerning your laboratory's responsibility to report communicable diseases call your local health department or Dr. William Hall at (517) 335-8165.

A new concept in reporting communicable disease reports is being pursued on national and state levels. Recent public health challenges in tracking emerging infectious diseases like novel antibiotic resistance as well as the opportunity to utilize laboratory information systems standards, are driving the development of electronic laboratory surveillance. In this new era, reportable laboratory results already entered in a LIS would be sorted, encrypted and converted to a standardized format and then transferred electronically to a public health agency data repository. Public health agencies would then transfer these reports to public health data bases for analysis and for identifying appropriate activities. This system would eliminate the need for laboratories to file paper reports of communicable diseases and public health departments to re-enter case data into their data bases. The system promises to improve the timeliness, accuracy and completeness of disease reporting data and save laboratories clerical resources. Bureau of Infectious Disease Control personnel are forming advisory committees consisting of representatives from local public health, medical laboratory community, infectious disease practices, hospitals, hospital systems and information systems industry to formulate an electronic laboratory reporting system for Michigan.

### Laboratory Reporting Requirements

A report is to be made if a laboratory confirms the presence of any of the following agents in a person:

*Bacillus anthracis* (1)
*Bordetella pertussis* (1)
*Borrelia burgdorferi*
*Brucella* species
*Calymmatobacterium granulomatis* (1)
*Campylobacter jejuni*
*Chlamydia* species
*Clostridium botulinum* (1)
*Corynebacterium diphtheria* (1)
*Cryptosporidium* species
*Entamoeba histolytica*
*Escherichia coli* O157:H7
*Francisella tularensis*
*Giardia lamblia*
*Haemophilus ducreyi* (1)
*Haemoplilus influenza* (type b) (1)
Hemmorrhagic fever viruses (1)
Hepatitis B surface antigen (1)
Influenza virus
*Legionella* species
*Listeria monocytogenes*
Measles (Rubeola) virus (1)
Mumps virus
*Mycobacterium tuberculosis*
*Neisseria gonorrhoeae*
*Neisseria meningitis*
*Plasmodium* species
Poliovirus (1)
Rabies virus
Rubella virus
*Salmonella* species
*Shigella* species
*Treponema pallidum* (1)
*Trichinella spiralis*
*Vibrio cholera*, servar 01 (1)
Yellow fever virus
*Yersinia enterocolitica*
*Yersinia pestis*

The unusual occurrence, outbreak, or epidemic of any infection.

(1) Immediate report requested, reporting within 24 hours of discovery is required.

# High Performance Liquid Chromatography Method for Identification of *Mycobacterium* sp. by Mycolic Acid Pattern

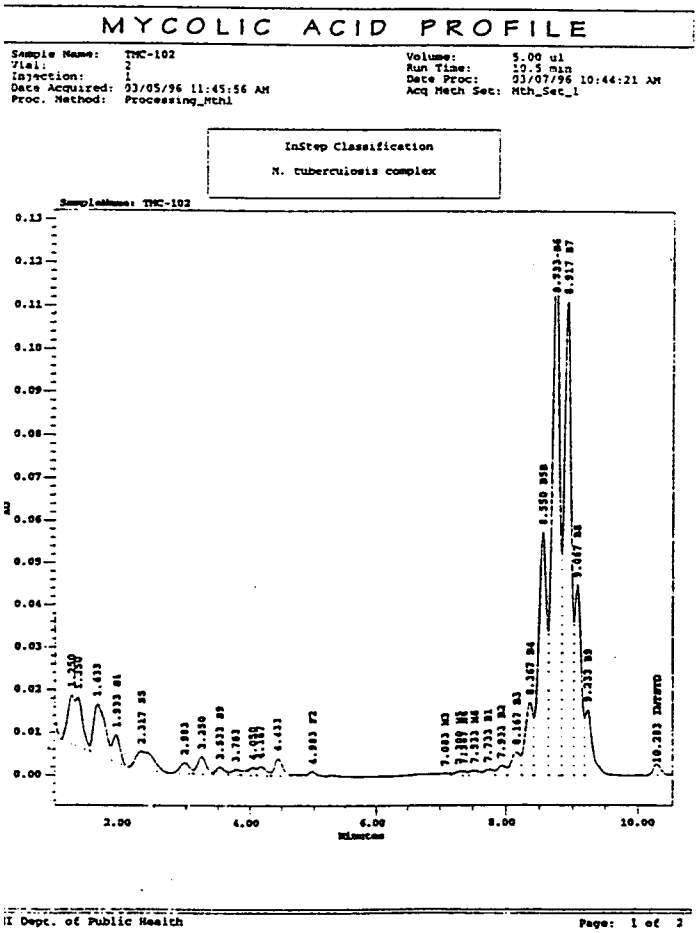
*Judith Kloss Smith, Laboratory Scientist, Chromatography Laboratory*

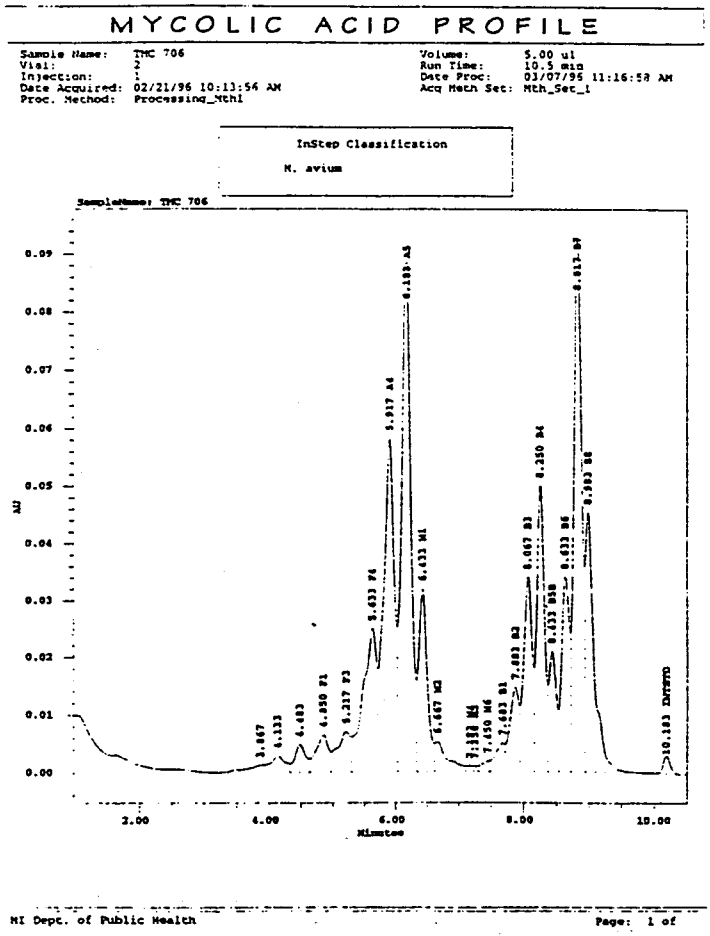
High performance liquid chromatography (HPLC) is a liquid-solid chromatographic method that is used to separate samples of complex mixtures. The sample is suspended in a liquid mobile phase and the mixture is forced through a solid stationary phase that is contained in the column. A high pressure pump is used to move the mobile phase through the column. Separation of the mixture occurs due to reactions between the sample, the mobile phase, and the stationary phase.

Suspect cultures of *Mycobacterium*, *Tsukamurella*, *Nocardia* or *Rhodococcus* species are analyzed for their mycolic acid profiles. These fatty acids are present in the cell wall. Mycobacterial mycolic acid structures range in size from $C_{60}$ to $C_{90}$. All *Mycobacterium* species contain mycolic acids in various combinations. An extraction procedure is used that first releases cellular components from whole cell suspensions and then converts the mycolic acids to UV absorbing bromophenacyl esters.

At the Michigan Department of Community Health, pattern recognition software system, InStep[tm] (Infometrix, Incorporated, 2200 Sixth Avenue, Suite 833, Seattle, Washington 98121) is used to identify HPLC profiles. Although this software system is still evolving, it does a very good job of identifying the most common *Mycobacterium* species. This identification system is one of the tools that the Mycobacteriology Unit uses to decrease turn-a-round time for lab results, including presumptive identification of new cases of *M. tuberculosis*.

The following patterns are typical profiles that InStep[tm] generates from an HPLC pattern:



# DNA PROBE TESTING FOR CHLAMYDIA AND GONORRHOEAE

*Kirsten White, MT(ASCP)*

Those of you involved in collecting and sending specimens to the Upper Peninsula Laboratory for Chlamydia and Gonorrhoeae DNA Probe testing know that occasionally a specimen cannot be processed by the laboratory because it is determined to be unsatisfactory. We would like to address this problem and list common errors which are made and how to best prevent them from occuring.

Filling out the paperwork associated with the specimens can seem to be tedious and routine. However, particular attention must be paid to this integral step in the specimen collection process. The following is a checklist designed to help to avoid the most common problems encountered in this area.

1. The requisition slip must be filled out completely, both the white and yellow copies. If using a rubber stamp, remember to stamp the yellow copy also.

2. Please write LEGIBLY or type the information on the blanks and tubes.

3. The specimen source and the date taken must be filled in. ***Note:*** *specimens must be received within seven days to give a reliable test result.* This means that if the specimen is taken on the 10th, it must be received by the laboratory by the 16th. If it is received on the 17th, it is too old.

4. Requisition slips must have the submitting institution filled in on the top and in the proper location.

5. Patient identification numbers and names must match exactly on the specimen tube and the requisition slip. Double check the numbers and names on the tubes and slips before submitting and make sure they match; many errors have been made recently where the names are misspelled and/or the numbers are not identical.

6. The requisition slip must be sent on the outside of the plastic bag which contains the specimen; if it is inside the bag, and the specimen leaks, the slip will be ruined. *An additional note*: the slips need not be wrapped around each specimen; they may be placed flat in the envelope alongside the wrapped specimens. As long as both the specimens and requisition slips are labeled and they match exactly, they will not be rejected.

7. Submit the correct requisition slip for each test that is desired.

A few items which have to do with the preparation of the specimen should be addressed:

1. Follow the written directions on the specimen collection kit.

2. Do not send the specimen if there is no swab in the specimen container. (Yes, this does happen, believe it or not!)

3. Use only female swabs for female patients and male swabs for male patients. Only genital sources are acceptable specimens at this time.

4. Use only the swabs contained in the GEN-PROBE collection kit. Other swabs are unsatisfactory (example: wooden swabs).

5. Insert only ONE swab in the specimen container.

6. Caps on the specimen tubes must be put on correctly. Crooked or loose caps result in leakage and an unsatisfactory specimen.

Hopefully these pointers will help to reduce the number of unsatisfactory specimens that occur. If you have any questions, feel free to call the Upper Peninsula Laboratory at (906) 482-3011.

## Water Analysis Section Transferred to DEQ

*Theodore J. Williams, Ph.D.*

It was announced Thursday, March 28th, that the Water Analysis Section will be transferred to the Department of Environmental Quality (DEQ). This was among the last issues to be settled with regard to the Governor's executive order reorganizing all previous Michigan Department of Public Health programs. Many MDPH programs have been combined with mental health and Medicaid programs in the newly defined Department of Community Health. Virtually all work at the state level in environmental health programs has now been moved out of the state health department.

Internal organization issues still need to be resolved within DEQ, but it appears the water lab will be a part of the new "Drinking Water and Radiological Protection Division" in DEQ. This division will continue water supply and environmental radiological health responsibilities of the disbanded MDPH Bureau of Environmental and Occupational Health.

In it's earliest beginnings, environmental health protection, i.e. prevention of human exposure to disease causing agents in air, water, food, sewage, garbage, etc., was literally synonymous with public health. The trend to separate environmental public health programs from the traditional public health establishment appears to have started with the creation of the U.S. Environmental Protection Agency which began to absorb related national programs. Drinking water was the last major federal program to go in about 1976 when this responsibility was moved from the U.S. Public Health Service to EPA. The federal changes in organization, along with the system of EPA grants of federal funds for environmental health related programs, have encouraged most states to adopt the EPA organizational template. The organizational separation of environmental health from public health is now complete at the state level with air, water, and waste disposal programs being in DEQ, and food sanitation related programs going to the Department of Agriculture.

At the local level, environmental health remains a major component of all county and district public health departments. Despite organizational and budgetary changes, we must continue to maintain and strengthen the link between local health departments and state water supply personnel. The chain of citizen input, local investigation, and state technical and scientific support has been responsible for detecting and managing nearly all instances of potentially harmful ground water contamination in Michigan, most of which were not covered by drinking water regulatory programs.

Within the Water Analysis Section we expect there will be problems to resolve as part of our transfer to DEQ, but we also hope to see new opportunities for improving service for our clients. We will need to get used to yet another set of organizational name changes, but we expect to be doing the same types of work for existing clients. We expect to stay at the same location with the same phone numbers, and we most certainly hope to continue the same interactions with local health professionals and laboratory colleagues that have previously benefitted us all.

## LABORATORY INTRODUCES USE OF NEW FORM FOR BETTER SERVICE

*Louis Guskey, Ph.D., Virology Section*

Within the next five months the Virology Section will incorporate new computer software (the EPIC system) into the laboratory operation. The advantages of this new system are:

1) more rapid processing
2) faster results
3) more accessible results
4) better and more complete data on outbreaks and other situations

The system will, however, automatically reject specimens not submitted in compliance with directions printed on the reverse side of the new test requisition forms (e.g., a combination of the FB-8 for syphilis testing, the FB-49 for HIV testing, and all other forms used in the Virology Section). When an incorrectly completed form is received, the submitter will be notified of the problem. Compliance will be monitored over a 30 day grace period, after which specimens will be discarded without testing.

Persons submitting specimens to the Microbiology Section are already familiar with the new forms. The entire laboratory will use the EPIC system for all specimens, so we all need to become accustomed to the new forms. The end result will be more efficient service to specimen submitters.

The Virology Section will work with all submitters to make the transition to the new system as smooth as possible. For further information or assistance, call Dr. Louis Guskey at (517) 335-8067.

# What Happens in a Food Borne Outbreak Investigation?

*Susan L. Shiflett, Microbiologist*

You and your co-workers have an enjoyable summer picnic. About 12 hours later, you find yourself spending a joyless evening in the bathroom. When you call in sick the next morning, you find that 5 of your cohorts have called in sick with same complaints. Was it something you ate? Many people worry about food borne illness during the warm summer months. The fact is that food borne outbreaks can occur any time that food has been improperly prepared or stored.

What should you do if you suspect you are the victim of a food borne outbreak? The first agency to be notified will be the local health department. The local health department will investigate the cause of the outbreak, defined as two or more sick individuals who are unrelated, and/or do not reside in the same household. The exception to this protocol is a suspected case of botulism, where even one case is considered an outbreak.

Once notified of a potential outbreak, the local health department will assign a public health sanitarian to inspect the food service establishment, interview the food handlers, and collect information on food preparation, handling and storage. The sanitarian will also collect any food samples to be submitted to the laboratory for testing. Sanitarians work closely with the county's communicable disease coordinator and/or public health nurses, who interview exposed individuals to collect data on symptoms, incubation times, duration of the illness, and specific foods consumed. The communicable disease coordinator and public health nurses act as liaisons between the local health department, the local hospitals and physicians, determining what human specimens should be submitted to the laboratory for testing.

According to Robert M. Schmidt, MPH, of the Barry-Eaton District Health Department, the information collected and assembled during a suspected outbreak is extremely important. In many cases, the suspected food has been consumed or discarded. This leaves the cause of many outbreaks "to be determined by the statistical information collected".

The epidemiologists in the Disease Control Section of the Michigan Department of Community Health will provide assistance to the county health department for the collection and evaluation of data. The Disease Control Section must be notified of a suspected food borne outbreak before specimens are submitted to the department for testing. The reason for conducting an investigation of a food borne outbreak is twofold according to William Hall, M.D., of the Disease Control Section. "The food borne investigation is used to stop outbreaks and to ensure the safety of the food industry. This is done by interrupting the transmission, and learning about the food handling practices that may be dangerous to the consumer".

Microbiologists use the information provided by the sanitarians, nurses, and the epidemiologists to determine which test procedures will be used on food and human specimens submitted to the laboratory. The laboratory will test for the organism(s) most likely to cause the reported symptoms. The Microbiology Section of the Michigan Department of Community Health may test for nine (9) organisms known to cause food borne illness (Table 1). The county health department is notified of all test results.

The cooperation between physicians, local and state health departments is essential in the investigation of food borne outbreaks. With all of us working together, we can ensure the safety of the food supply in the state of Michigan.

Table 1

**ORGANISMS THAT CAUSE FOOD BORNE OUTBREAKS**

| Organism | Incubation Period | Symptoms |
|---|---|---|
| *Bacillus cereus* | 1-6 hours (emetic) | nausea, vomiting, retching, diarrhea, abdominal pain, prostration |
| | 8-22 hours (diarrheal) | abdominal cramps, diarrhea |
| *Campylobacter jejuni* | 12-72 hours | abdominal cramps, diarrhea, vomiting, fever, chills, malaise |
| *Clostridium botulinum* | 12-72 hours | vertigo, double/ blurred vision, loss of reflex to light, difficulty swallowing, breathing, and speaking,dry mouth, weakness, respiratory paralysis |
| *Clostridium perfringens* | 8-22 hours | abdominal cramps, diarrhea |
| *Escherichia coli* O157:H7 | 12-72 hours | abdominal cramps, bloody diarrhea, chills, malaise, vomiting, fever |
| *Salmonella* species | 12-72 hours | abdominal cramps, diarrhea, vomiting, fever, chills, malaise |
| *Staphylococcus aureus* | 1-6 hours | nausea, vomiting, retching, diarrhea, abdominal pain, prostration |
| *Shigella* species | 12-72 hours | abdominal cramps, diarrhea, vomiting, fever, chills, malaise |
| *Yersinia enterocolitica* | 12-72 hours | abdominal cramps, diarrhea, vomiting, fever, chills, malaise |

Food and feces are the specimens of choice for food borne outbreak investigations. When *Bacillus cereus*, *Clostridium perfringens*, or *Staphylococcus aureus* are suspected, stools must be accompanied by the suspected food item.

# MICHIGAN DEPARTMENT OF COMMUNITY HEALTH TO INSTITUTE HANTAVIRUS IgG AND IgM TESTING

*Patty Clark, MPH*

Hantavirus pulmonary syndrome (HPS) was first reported in the Southwest United States in May 1993. HPS is characterized by fever, headache, and cough, followed by rapid development of respiratory failure. The overall case fatality rate is 50%; yet of those cases with onset since 1/1/94, the case fatality rate has been 39.2%. As of February 8, 1996, 128 cases have been reported in 24 states (CDC, unpublished data, 1996).

Rodents are the primary reservoir hosts of all recognized hantaviruses. Each hantavirus appears to have a preferential rodent host, but other small mammals can also be infected. Most of the cases of HPS have resulted from a single virus (Sin Nombre Virus) associated with the deer mouse (*Permyscus maniculatus*). However, at least one case has resulted from infection by a second hantavirus associated with the cotton rat (*Sigmodon hispidus*).[1] Arthropod vectors are not known to transmit hantaviruses.

Human infection can occur when infective saliva or excreta are inhaled as aerosols. Infection has also occurred as a result of rodent bites.[1] Most cases of human illness have resulted from exposure to naturally infected wild rodents in a rural environment. Person-to-person transmission has not been reported with any of the hantaviruses.

The Michigan Department of Community Health is now offering serologic testing for Hantavirus IgG and IgM antibodies in humans. Samples will be tested using an enzyme linked immunoassay for IgG and an IgM capture ELISA. The acute specimen should be drawn near admission. A second sample should be drawn as late as possible, no later than 21 days after the acute. Single serum samples will be accepted. A sample volume of 2.5 ml of serum is the preferred amount. It will be necessary to submit a further sample for confirmation testing if antibodies are detected initially. It should also be noted that these procedures are limited to the detection of IgG or IgM antibodies to Sin Nombre Virus strain of hantavirus. Specimens will be accepted form patients who exhibit disease consistent with the current case definition of HPS. Potential cases must have one of the following:

- febrile illness (temperature of at least 101°F) occurring in a previously healthy individual, characterized by unexplained respiratory distress syndrome or bilateral interstitial pulmonary infiltrates developing within one week of hospitalization with respiratory compromise requiring supplemental oxygen, **OR**
- unexplained respiratory illness resulting in death in conjunction with an autopsy examination demonstrating noncardiogenic pulmonary edema without identifiable cause of death.

Potential case-patients are to be excluded if they have a predisposing underlying medical condition or an acute illness that provides a likely explanation for the respiratory illness.

Questions regarding specimen submission or testing should be directed to Patty Clark (517) 335-8102.

[1] CDC. Laboratory Management of Agents Associated with Hantavirus Pulmonary Syndrome: Interim Biosafety Guidelines, 1994. MMWR 1994; 43:1-3.

**LabLink** is published quarterly by the Michigan Department of Community Health to provide laboratory information to Michigan Health professionals and to the public health community.

**Director, Laboratory Services Division**
Robert Martin, MPH, Dr.P.H.

**Editor**
Susan Shiflett

**Design and Layout**
Kimberly Binney

Michigan Department of Community Health
Laboratory Services Division
PO Box 30035
Lansing, MI 48909-7535